Identifying workers at risk of sickness absence
by questionnaire

Corné A. M. Roelen1, Tjepke R. van der Pol1, Petra C. Koopmans2 and Johan W. Groothoff3

Background Sickness absence is an important economic problem, because of high costs and lost productivity. Determining factors associated with increased risk of sickness absence may lead to the development of preventive measures.

Aims To determine whether self-report questionnaires can identify those employees at risk of sickness absence

Methods Prospective study of 238 healthy administrative workers. Participants completed a questionnaire proven to be valid and consistent. The questionnaire consisted of 116 items about health, work and working conditions. Sickness absence was followed-up for a period of 1 year.

Results The questionnaires of 191 workers (80%) were suitable for analysis. The number of reported health complaints was significantly (P < 0.01) associated with sickness absence (OR 2.18; 95% CI 1.32–3.61). Concentration problems were correlated with more frequent absences, and both nervous complaints and coping problems with longer duration. Age (OR 0.96; 95% CI 0.93–0.99; P = 0.02) and job insecurity (OR 0.68; 95% CI 0.47–0.98; P = 0.04) were negatively associated with sickness absence. Psychosocial and physical work factors were not associated with sickness absence.

Conclusions Questionnaires on health and work can identify employees at future risk of sickness absence. Workers who report multiple health complaints, especially concentration problems, nervous complaints or coping problems, may be at increased risk of sickness absence.

Key words Health complaints; physical work factors; psychosocial work factors; risk factors for sickness absence; self-report questionnaires.

Introduction

Sickness absence is a major public health problem, and has important economic impact in terms of lost productivity, employment, replacement and insurance costs. Sickness absence is related to health [1–3], but other factors have also been associated with it. Physical factors such as heavy-duty work [4], repetitive work and heavy lifting [5] have been found to correlate with sickness absence as well as psychosocial work factors such as decision latitude and co-worker support [6–8]. However, little is known about predictors of sickness absence. Eriksen et al. [9] studied 5563 Norwegian nurses’ aides and concluded that perceived lack of supportive culture in a work unit, working in psychiatric or paediatric wards, and health complaints were associated with a higher risk of sickness absence. Andrea et al. [10] reported the presence of at least one long-term disease and lower levels of decision latitude to be the strongest predictors for sickness absence among 1271 employees of the Maastricht Cohort Study. North et al. [6] concluded from the Whitehall II study, that the psychosocial work environment predicted rates of sickness absence among British civil servants. Vaananen et al. [8] reported that low job complexity and lack of co-worker support predicted very long (>21 days) absence episodes in men, whereas lack of supervisor support was a predictor in women.

The aim of this study was to elucidate whether self-completed questionnaires can identify employees still at work but at risk of future sickness absence.

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Methods

Dutch occupational law obliges companies to offer a health check to their personnel every 4 years. As a consequence of this legislation, two administration organizations with low (<5%) company absence levels offered a health check to their personnel. The health checks included a validated self-completed questionnaire, a series of biometric measurements and physical examination. The results from the questionnaires were correlated with sickness absence occurring in the year following the health check. Age, gender and educational level (1 = none or primary school, 6 = academic) were included as confounders.

Ethical approval was sought from the Medical Ethics Committee of the University Medical Centre, Groningen, who advised that ethical clearance was not required as the health checks were statutory and not performed on behalf of this study. Moreover, we only used the data from the questionnaires and according to Dutch law, ethical approval is not needed for research on questionnaire results. We explained to the workers that the results would be analysed and reported on group level, after which they gave informed consent.

The self-completed questionnaire was developed by Weel and Fortuin [11]. It consisted of 116 validated questions about health complaints, impairments, diseases and recent medical treatment, as well as experienced working conditions, aspects of workplace organization and interpersonal relationships at work. The questions were answered with yes or no.

Sickness absence data were obtained from our occupational health registration files. We used the sickness absence parameters defined by Hensing et al. [12]. The numbers of days absent (partial days off of work were counted as full sick days) and episodes of absence in the year following the occupational health examination were counted. The mean duration of an absence episode was calculated as the total number of days absent divided by the number of episodes.

The data were analysed using SPSS for Windows, version 11. Factor analysis of the questionnaire was performed with the Varimax Rotation Method after which subscales were defined. The subscales were tested with reliability analysis, and were included in further statistics if Cronbach’s alpha >0.50. The association of the subscales with sickness absence was investigated using multivariate logistic regression analysis in which sickness absence was a binary variable, being absent (i.e. no absence days in the follow-up period) or present (i.e. one or more absence days in the follow-up period).

Forward stepwise multivariate regression analysis was used to correlate the health complaints with the number of days absent/year, absence episodes/year and mean duration of absence episodes. Data are presented as mean ± standard deviation (SD) and significance is taken as $P < 0.05$.

Results

The two administration organizations employed 238 workers between them. Thirteen employees were not included in the study: four workers had a known chronic disease, six workers were on sick leave at the time of examination and three workers decided against an occupational health examination. From the 225 participating workers, 22 were excluded because their questionnaires were anonymous and could not be followed-up and seven because their questionnaires were not complete. Another five workers were excluded because they resigned their job during the year of study. Thus, we analysed the questionnaires of 191 workers (80%), of whom 87 were men (mean age 42.8 ± 11.2 years, mean educational level 4.15 ± 0.93) and 104 were women (mean age 41.0 ± 10.7 years, mean educational level 4.50 ± 1.01). In the follow-up period, the 191 participants had 23.7 ± 53.9 days absent/year and 14.4 ± 43.9 days absence per episode. The number of absence episodes/year was 1.47 ± 1.60 during follow-up.

Factor analysis of the questionnaires showed that 55 items could be assigned to eight subscales. The associations between the other questions and sickness absence were not regarded as strong enough to form a subscale to measure one concept. The scores of the eight defined subscales and the results of their reliability analysis are shown in Table 1.

The subscales Job control and Lifestyle had a Cronbach’s alpha score of 0.50 and 0.19, respectively. Both were therefore excluded from further statistical analysis. The remaining six subscales were included in a multivariate logistic regression analysis, together with age, gender and educational level (Table 2).

The subscale Health complaints correlated significantly ($P < 0.01$) with sickness absence. Logistic regression analysis showed a positive regression coefficient (B) for the subscale Health complaints, indicating that it was positively correlated with sickness absence: workers who mentioned multiple health complaints had

<table>
<thead>
<tr>
<th>Table 1. Scores and reliability analysis of the subscales of the self-report questionnaires ($n = 191$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale</td>
</tr>
<tr>
<td>Health complaints (18 items)</td>
</tr>
<tr>
<td>Job satisfaction (5 items)</td>
</tr>
<tr>
<td>Social support at work (8 items)</td>
</tr>
<tr>
<td>Job insecurity (2 items)</td>
</tr>
<tr>
<td>Psychological job demands (6 items)</td>
</tr>
<tr>
<td>Physical job demands (8 items)</td>
</tr>
<tr>
<td>Job control (3 items)</td>
</tr>
<tr>
<td>Lifestyle (5 items)</td>
</tr>
</tbody>
</table>

The scores of the eight subscales on the self-report questionnaires ($n = 191$) and the result of their reliability analysis.
Table 2. Multivariate logistic regression analysis of the results of 191 participants

<table>
<thead>
<tr>
<th></th>
<th>B ± SE</th>
<th>OR</th>
<th>95% CI</th>
<th>Wald-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.04 ± 0.02</td>
<td>0.96*</td>
<td>0.93–0.99</td>
<td>5.61</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.20 ± 0.38</td>
<td>0.82</td>
<td>0.39–1.75</td>
<td>0.26</td>
</tr>
<tr>
<td>Educational level</td>
<td>-0.19 ± 0.23</td>
<td>0.83</td>
<td>0.52–1.31</td>
<td>0.67</td>
</tr>
<tr>
<td>Health complaints</td>
<td>0.78 ± 0.26</td>
<td>2.18**</td>
<td>1.32–3.61</td>
<td>9.26</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>-0.16 ± 0.20</td>
<td>0.85</td>
<td>0.58–1.26</td>
<td>0.64</td>
</tr>
<tr>
<td>Social support</td>
<td>-0.13 ± 0.20</td>
<td>0.88</td>
<td>0.59–1.30</td>
<td>0.43</td>
</tr>
<tr>
<td>Job insecurity</td>
<td>-0.39 ± 0.19</td>
<td>0.68*</td>
<td>0.47–0.98</td>
<td>4.35</td>
</tr>
<tr>
<td>Psychological job demands</td>
<td>0.09 ± 0.20</td>
<td>1.10</td>
<td>0.75–1.62</td>
<td>0.23</td>
</tr>
<tr>
<td>Physical job demands</td>
<td>0.11 ± 0.22</td>
<td>1.12</td>
<td>0.74–1.71</td>
<td>0.29</td>
</tr>
</tbody>
</table>

B is the regression coefficient which indicates the type (positive or negative) of the correlation with sickness absence; multivariate odds ratios (ORs) and the 95% confidence intervals (CIs) are presented (*P < 0.05 and **P < 0.01); the Wald-statistic is a measure for the importance of the correlation: a higher Wald-statistic means a stronger correlation of the variable with sickness absence. The Nagelkerke $R^2$ of all factors in this regression model is 0.18.

A higher probability of being absent (OR 2.18; 95% CI 1.32–3.61).

Age (OR 0.96; 95% CI 0.93–0.99; $P = 0.02$) and Job insecurity (OR 0.68; 95% CI 0.47–0.98; $P = 0.04$) were negatively associated with sickness absence. Gender, educational level, physical and psychological job demands, job satisfaction and workplace social support were not associated with sickness absence (Table 2).

All absence parameters were positively skewed and normal distribution was attained after logarithmic transformation. Forward stepwise multiple regression techniques revealed which health complaints were correlated with the transformed absence parameters (Table 3).

Problems with concentration were correlated positively with the number of days absent/year ($P < 0.01$) and episodes of absence/year ($P < 0.05$). Coping problems ($P < 0.01$) and nervous complaints ($P < 0.05$) were correlated with the mean duration of absence.

**Discussion**

This study demonstrates that reporting multiple health complaints is a risk factor for sickness absence. This finding is in agreement with Eriksen et al. [9] who reported that health complaints were associated with a higher absence risk. Andrea et al. [10] concluded that the presence of a chronic disease is one of the strongest predictors for sickness absence. Our study shows that complaining about health without the presence of a known chronic disease is also correlated with a higher probability of being absent. Moreover, we found the type of complaint to be important. Coping problems and nervous complaints were correlated with longer absence duration and concentration problems with more frequent absence episodes.

Job insecurity was associated with sickness absence in accordance with the results of Virtanen et al. [13], who found that fixed-term personnel and permanent employees have different thresholds for taking sick leave. Self-reported psychological job demands did not correlate with sickness absence, which is in agreement with Moreau et al. [14]. They reported that, although being the primary source of stress, job demands were not associated with sick leave. North et al. [6] concluded that low levels of work demands, control and support were associated with higher rates of short and long spells of absence in men and, to a lesser extent, in women. However, the relationships they found were substantially weakened when grade was controlled for, and only
sustained for lower grades. The mean educational level in our population was high, which could explain our different results.

Social support at work was not associated with sickness absence. This confirms the results of Hemingway et al. [15] who found no association between workplace social support and absence. Vaananen et al. [8] reported a higher risk of sickness absence when co-worker's support was low. In our study, workers perceived low social support because they were annoyed by the absence of colleagues or by errors of colleagues. Another cause of low social support was dissatisfaction with the supervisor. All workers, including the ones scoring low on social support, reported good social contacts with colleagues. Probably, workplace social contacts have a protective effect against absence.

Physical job demands have been reported to correlate with sickness absence. Eshøj et al. [4] studied risk factors for long-term (>10 weeks) sickness absence in a population of 481 Danish workers. Multivariate analysis identified heavy-duty work and back pain as risk factors for sickness absence. Monotonous, repetitive work was a risk factor among men only. Our study demonstrates that self-reported physical job demands are not associated with sickness absence. It should be remembered that we relied on self-reported rather than assessed working conditions. Most administrative staff did not report physical work strains. The results could be biased by occupational selection and therefore only apply to office workers.

In our study, many workers reported maximum scores. This could be due to the fact that the questionnaires were not anonymous. It is possible that workers gave answers that were more favourable than their actual perception of health and working conditions for fear of their results being passed to their supervisors. However, verification of the questionnaire responses during the health check revealed no evidence for socially desirable responses. The favourable working conditions could be an alternative explanation for the high scores. Therefore, our results may not be representative for the total working population but only for personnel of companies with good working conditions. In line with the results of Piirainen et al. [16], it is conceivable that work factors play a more important role in sickness absence among workers from companies with worse working conditions.

We conclude that questionnaires on health and work can identify employees still at work, but at increased risk of sickness absence. Occupational physicians should be aware that workers who report multiple health complaints, especially concentration problems, nervous complaints or coping problems, may be at increased risk of future absence. These complaints are correlated with more frequent or longer duration absence. This study was performed among healthy administrative employees working in companies with low absence levels. Future research should study different occupations and widen its scope to organizations with unfavourable working conditions.

**Conflicts of interest**

None declared.

**References**


